REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Status of Claims:

No claims are currently being canceled.

Claims 1, 15 and 19 are currently being amended.

No claims are currently being added.

This amendment and reply amends claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claims remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 1-3 and 5-19 are pending in this application.

Claim Rejections – Indefiniteness:

In the Office Action, claims 1-19 were rejected under 35 U.S.C. § 112, 2nd paragraph, as being indefinite, for the reasons set forth on pages 2 and 3 of the Office Action. With respect to the rejection of claim 1 based on a "driving signal supplying unit" and a "driving unit that drives the step motor", that claim has been amended to change 'driving signal supplying unit' to 'clock signal supplying unit'. Accordingly, there is no longer any possibility of ambiguity with respect to the claimed "driving unit" and the claimed "clock signal supplying unit." With respect to the rejection of claim 1 concerning the phrase "to control a signal line of the driving unit for driving the step motor to be open in the non-hand-driven state", it is respectfully submitted that one skilled in the art would interpret the word "open" to correspond to a 'high impedance' state that is neither a HIGH state (e.g., logic level "1") or a LOW state (e.g., logic level "0"), as that word is normally interpreted in circuit design. Figure 5 clearly shows that signals AA and BB can be in a "H" state, a "L" state, or in an OPEN state (dotted lines) that does not correspond to either the "H" or the "L" state.

With respect to the comments made on page 3 of the Office Action concerning the word "OPEN", in the non-hand driven state, the signals AA and BB are either in a "H" state

or an OPEN state, whereby these are two separate and distinct states, and whereby the Office Action's interpretation of "OPEN" meaning "OFF" is not correct, since the signal driving the step motor can be in a non-OPEN state and yet be in a state that does not drive the step motor. Please also note that the word "OPEN" is commonly used in the field of clock motor control, as described, for example, in column 3, lines 20-25, column 11, lines 17-18 and 31-32 of U.S. Patent No. 6,262,554. During the periods shown by dashed lines in Figure 6 of the drawings, S18 is high, S19 is low, S20 is high, and S21 is low. Thus, all of the MOSs 131, 132, 133 and 134 of the motor driving circuit 103, to which the signals are respectively input, are placed in a "high impedance" state (i.e., OPEN state).

Accordingly, independent claim 1 is not indefinite with respect to the word "OPEN".

Lastly, with respect to the indefiniteness rejection of claim 15, that claim has been amended so that it now depends from claim 9, and whereby that claim has been rewritten so that it fully complies with 35 U.S.C. § 112, 2nd paragraph.

Claim Rejections – Prior Art:

In the Office Action, claims 1-3 and 6-17 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,404,510 to Nakajima; and claims 5, 18 and 19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakajima[1]. These rejections are traversed with respect to the presently pending claims under rejection, for at least the reasons given below.

Claim 1 now recites, among other things:

the controlling unit is configured to control a signal line of the driving unit for driving the step motor to be open in the non-hand-driven state, except for a time period before and/or after the driving pulse is output.

Nakajima does not disclose or suggest a controlling unit that controls a signal line of a driving unit for driving a step motor to be open in a non-hand-driven state, except for a time period before and/or after the driving pulse is output.

[1] While page 4 of the final Office Action only states that claims 18 and 19 were rejected under 35 U.S.C. § 103(a), it is believed that claim 5 was also intended to be included in this rejection, based on a review of the prior Office Action.

In more detail, as shown in Figures 3 and 4 of Nakajima, φ8 and φ9 are high during a non-hand-driven state (i.e., during the periods other than t1 and t2), and thus transistors 24a and 24b are in a high impedance state. On the other hand, φ10 and φ11 are high except for time periods corresponding to short pulses for chopper amplification, and thus except for those time periods, transistors 24c and 24d are ON and terminals a0 and b0 to which the motor 25 is connected remain in a LOW state, which is not a high impedance state (see Figure 10 of Nakajima).

Thus, Nakajima and the presently claimed invention are different with respect to how motor terminals operate during a non-hand-driven state. Nakajima can detect a counter electromotive force due to an impact only when chopper amplification pulses are output, and thus it cannot take immediate actions with respect to strong impacts. In stark contrast to this, the present invention as exemplified by presently pending independent claim 1 can take immediate actions to react to strong impacts, since in a non-hand-driven state, the transistors remain in an OPEN state except for time periods in which chopper amplification pulses are output.

As described above, a major difference between Nakajima and the presently claimed invention is that the voltages of terminals in a non-driven state are fixed in Nakajima, whereas they are substantially OPEN in the present invention except for time periods before and/or after the driving pulse (i.e., T1 and T2 as shown in Figure 5 of the drawings). As a result, the present invention can detect strong impacts that cannot be detected by chopper amplification.

Still further, Nakajima discloses a chopper-amplifying unit that amplifies the counter electromotive force caused by an impact. As recited in presently pending independent claim 1, an impact detecting unit detects an impact applied externally based on an output signal level of a counter electromotive force generated by a step motor. See, for example, Figure 5 of the drawings and paragraph [0042] of the specification. The detection of the impact, in which a controlling unit controls a signal line of a driving unit for driving the step motor to be **open** in a non-hand-driven state, are features that are not disclosed or suggested by Nakajima. Note that the term "open" does not mean that the signal line is in a High state or a Low state;

rather, it means that the signal line is in a High Impedance state, which is neither a High state (e.g., logic level "1") or a Low state (e.g., logic level "0").

Such a setting of a state of a signal line of a driving unit for driving a step motor to be OPEN (e.g., high impedance state) in a non-hand-driven state is not disclosed or suggested by Nakajima.

Accordingly, for the reasons given above, presently pending independent claim 1 is not anticipated by Nakajima.

With respect to the rejection of dependent claim 10, please note that since the operation of the motor becomes unstable if a driving pulse is output immediately after the open state, the stable points are provided before and after the output of the driving pulse (see Figure 6 and the corresponding description of that figure in the specification). In particular, see the T2 section and the T5 section in Figure 6, whereby the waveform of current is at a constant level during the T2 section and during the T5 section.

Such features as recited in claim 10 are not disclosed or suggested by Nakajima.

With respect to the rejection of dependent claim 2, the Office Action asserts that element 24 as shown in Figure 3 of Nakajima corresponds to the claimed chopper-amplifying unit. Applicants respectfully disagree. Namely, column 4, lines 30-51 of Nakajima describes that reference numeral 24 is a driving circuit that includes two P channel MOS transistors 24a, 24b, and two N channel MOS transistors 24c, 24d, whereby drawings of the MOS transistors 24a, 24c are connected with each other, and drains of the MOS transistors 24b, 24d are connected with each other. Nowhere does Nakajima state that his driving circuit 24 corresponds to a chopper-amplifying unit, as explicitly recited in presently pending independent claim 1.

In more detail, a description of what "chopper-amplifying" means in the context of claim 2 is shown in Figure 10 of the drawings. In particular, please note the following sentence in the specification:

> *As shown, by chopper-amplifying at a pre-determined period (1 ms in the shown example), the value of the current generated when the light impact is applied exceeds*

the threshold value Vth set in the inverters 145, 146 for detecting impacts and the impact can be detected at time t6.

None of the signals shown in Figures 4-7 of Nakajima corresponds to a "chopper-amplified signal" that amplifies a signal at an amplification ratio based on a predetermined pulse period that is set to a value that corresponds to at least one of a weight and a moment of inertia of time hands.

Accordingly, for the reasons given above, dependent claim 2 is not anticipated by Nakajima.

Lastly, with respect to dependent claim 19, that claim now recites that the detecting resistor is a variable resistor, and that the resistance value of the detecting resistor switches between a first resistance value used for impact detection and a second resistance value used for load compensation. In its rejection of claim 19, the Office Action merely states that the subject matter of this claim has been addressed in the rejections of claims 1, 9 and 12. However, this does not appear to be the case. In any event, Figures 10(1) to 10(4) of Nakajima, which show resistors r1 and r2 used in a driving circuit, are not variable resistors that are capable of having their respective resistance values switched between that for impact detection and that for load compensation.

Accordingly, for the reasons given above, dependent claim 19 is not anticipated by Nakajima.

Conclusion:

Since all of the issues raised in the Office Action have been addressed in this Amendment and Reply, Applicants believe that the present application is now in condition for allowance, and an early indication of allowance is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorize payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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